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10/738,361	12/17/2003	Carlos Avendano	CLABP206	8561

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EXAMINER	
SHAH, PARAS D	

ART UNIT	PAPER NUMBER
2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/738,361	AVENDANO ET AL.	
	Examiner	Art Unit	
	Paras Shah	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46,48 and 49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *24-26 and 34-46* is/are allowed.

6)☒ Claim(s) *1-23,27-33,48 and 49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is in response to the Arguments and Amended claims filed on 10/15/2007. Claims 1-46, 48, and 49 remain pending and have been examined. The Applicants' amendment and remarks have been carefully considered, but they are moot in view of new grounds for rejection and do not place the claims in condition for allowance. Accordingly, this action has been made FINAL.

2. All previous objections and rejections directed to the Applicant's disclosure and claims not discussed in this Office Action have been withdrawn by the Examiner.

Change of Art Units

5. It should be note that the Examiner has changed art units, which was formerly 2609. The Examiner's new art unit is 2626.

Response to Arguments

4. Applicant's arguments (pages 11-13) filed on 10/15/2007 with regard to claims 1-23, 27-33, 48, and 49 have been fully considered but they are moot in view of new grounds for rejection. Due to the newly added limitations, a new reference was applied for the independent claims (see below). The added limitations comprise "modified portions to at least one of the corresponding playback channels."

Response to Amendment

5. Applicants' amendments filed on 10/15/2007 have been fully considered. The newly amended limitations in claims 1-23, 27-33, 48, and 49 necessitates new grounds of rejection.

Claim Objections

6. Claim 45 objected to under 37 CFR 1.75 as being a substantial duplicate of claim 34. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-7, 9-15, 22, 27-33, 48, and 49 rejected under 35 U.S.C. 103(a) as being unpatentable over Avendano *et al.* ("Ambience Extraction and Synthesis from Stereo Signals for Multi-Channel Audio Up-Mix", May 2002) in view of Fincham (US 2002/0154783).

As to claims 1, 31, 48 and 49, Avendano *et al.* teaches a method for modifying an audio signal comprising a plurality of channel signals, the method comprising:

transforming at least selected ones of the channel signals into a time-frequency

domain (see page 1958, right column, sect. 4, 3rd paragraph, lines 1-2); c

comparing said at least selected ones of the channel signals (see page 1958, right column, sect. 4, 2nd paragraph, lines 3-4) in the time-frequency domain to identify corresponding portions of said channel signals that are not correlated or are only weakly correlated across channels (see page 1958, right column, sect. 4, 3rd paragraph, lines 2-10 and 1st paragraph, lines 3-8); and

modifying the identified corresponding portions of said channel signals (see page 1959, left column, equation 5, and 2nd paragraph, lines 11). For claims 48 and 49, a processor was used to produce the simulation (see page 1959, sect. 5) results of Figure 4. Also, the Figure 1 implementation was carried out (see page 1959, sect. 6).

However, Avendano *et al.* does not specifically teach the corresponding playback channels for the plurality of channel signals and modifying the portions of the corresponding playback channels.

Fincham does teach the **corresponding playback channels (see Figure 9-1, speakers 924 and 925) for the plurality of channel signals (see Figure 9-1, channels 911 and 912, left and right) and modifying the portions of the corresponding playback channels (see Figure 9-1, spectral weighting filter**

942, phase equalization 945, phase compensators 955, 956, and cross-cancellation 947) (e.g. The channels for the left and right are modified and output to the speakers. The modification occurs using the information from the original channels 911 and 912.).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the modifying of audio signal channels as taught by Avendano *et al.* with the modification of playback channels as taught by Fincham. The motivation to have combined the references involve the ability to provide a spectral boost over specific frequency ranges and correct timbral balance and to enhance the sound reproduction for the listener (see abstract, [0014])

As to claims 2 and 3, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 1, above.

Furthermore, Avendano *et al.* teaches defining a metric the value of which is determined for any set of corresponding portions of said channel signals at least in part by the degree of correlation between them (see page 1958, right column, sect. 4, 3rd paragraph, lines 1-2 and equation 2) (e.g. It is inherent that the computation of the cross-correlation will result in a value that defines the similarity between the signals. This is the definition of correlation. The corresponding portions relate to the critical bands between the channels being compared).

As to claim 4, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 2, above.

Furthermore, Avendano *et al.* teaches wherein the metric comprises calculating a coherence value (see page 1959, left column, 2nd paragraph, lines 1-4) (e.g. The use of this function allows for the calculation of a coherence value).

As to claim 5, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 4, above.

Furthermore, Avendano *et al.* teaches calculating a coherence value comprises using a coherence function, the value of which is approximately equal to one for portions of said channel signals that are highly correlated (see page 1959, left column, 2nd paragraph, lines 1-4) (e.g. The Avendano *et al.* reference states the value of the coherence function of one when the primary signal is dominant or highly correlated).

As to claims 6 and 7, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 4, above.

Furthermore, Avendano *et al.* teaches wherein calculating a coherence value comprises a coherence function, the value of which is approximately zero for portions of said channel signals that are uncorrelated or only weakly

correlated (see page 1959, left column, 2nd paragraph, lines 1-4) (e.g. the Avendano *et al.* reference states the value of the coherence function being close to zero for weakly correlated since ambience is present (see page 1958, right column, 1st paragraph, lines 3-4). Further, the actual coherence value for signals uncorrelated is not always zero but close to zero, which includes positive numbers greater than zero.)

As to claim 9, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 1, above.

Furthermore, Avendano *et al.* teaches wherein modifying the identified corresponding portions of said channel signals comprises applying a modification function, the value of which for any set of corresponding portions of said channel signals is determined at least in part by the degree of correlation between them (see page 1959, left column, equation 5, and 2nd paragraph, lines 1-10) (e.g. The modification function is multiplied by a coherence value, which implies a degree of correlation between signals).

As to claim 10, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 9, above.

Furthermore, Avendano *et al.* teaches wherein the modification function comprises a nonlinear function applied in the time-frequency domain (see page 1959, left column, 2nd paragraph, line 10, nonlinear function rho) **based on the**

degree of correlation (se page 1959, left column, 2nd paragraph, lines underneath equation 5 but before equation 6) (e.g. The low coherence regions are not modified and high coherence regions are modified as it is a function of the coherence function.).

As to claim 11, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 10, above.

Furthermore, Avendano *et al.* teaches wherein the nonlinear function comprises a hyperbolic tangent function (see page 1959, left column, equation and 2nd paragraph, lines 16, hyperbolic tangent function shown).

As to claim 12, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 9, above.

Furthermore, Avendano *et al.* teaches wherein modifying the identified corresponding portions of said channel signals comprises multiplying each of said channel signals in the time-frequency domain by a corresponding modification function value (see page 1959, left column, equation 5) (e.g. It is apparent that from the equation that the channel signals are being multiplied by the modification function).

As to claim 13, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 12, above.

Furthermore, Avendano *et al.* teaches wherein the modification function has a value equal to approximately one for portions of said channel signals that are not to be modified (see page 1959, left column, 2nd paragraph, lines 12-13).

As to claim 14, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 12, above.

Furthermore, Avendano *et al.* teaches wherein the modification function has a value other than one for portions of said channel signals that are to be modified (see page 1959, left column, 2nd paragraph, lines 13-14) (e.g. The Avendano *et al.* reference states that if the value is not 1 then modification is done).

As to claim 15, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 12, above.

Furthermore, Avendano *et al.* teaches wherein the modification function has a value equal to approximately one for portions of said channel signals that are to be extracted and a value equal to approximately zero for portions of said channel signals that are not to be extracted (see page 1959, left column, 2nd paragraph, lines 12-14 and lines 5-10) (e.g. It is implied by the Avendano *et al.* reference that the extraction and non-extraction occurs for various time and corresponding frequency indexes as denoted by m and k).

As to claim 22, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 1, above.

Furthermore, Avendano *et al.* teaches wherein the step of modifying comprises modifying the identified portions of the audio signal only within a prescribed frequency band (see page 1958, right column, sect. 4, 3rd paragraph, lines 3-6 and page 1959, left column, 1st paragraph, lines 3-5 and 2nd paragraph. (e.g. From the Avendano *et al.* reference that the frequency bands are modified depending on the identified portions from the coherence and correlation quantities and the use of the same time and frequency index m and k, respectively).

As to claim 27, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 1, above.

Furthermore, Avendano *et al.* teaches wherein transforming at least selected ones of the channel signals into a time-frequency domain comprises processing said channel signals using a subband filter bank (see page 1959, right column, Figure 3) (e.g. the Figure shows a subband for ambiance extraction).

As to claim 28, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 27, above.

Furthermore, Avendano *et al.* teaches wherein processing said channel signals using a subband filter bank comprises calculating the short-time Fourier transform (STFT) of said channel signals (see page 1959, right column, Figure 3) (e.g. It is seen that the input is transformed using the STFT).

As to claim 29, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 1, above.

Furthermore, Avendano *et al.* teaches processing said modified corresponding portions of said channel signals to synthesize a modified time-domain signal (see page 1959, right column, lines 6-8).

As to claim 30, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 29, above.

Furthermore, Avendano *et al.* teaches wherein transforming at least selected ones of the channel signals into a time-frequency domain comprises calculating the short-time Fourier transform (STFT) of said channel signals and wherein processing said modified corresponding portions of said channel signals to synthesize a modified time-domain signal comprises performing the inverse STFT on said signals (see page 1959, right column, Figure 3) (e.g. It is seen that the input signals are transformed to the frequency domain and the output signals are converted to the time domain by ISTFT).

As to claim 32, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 32, above.

Furthermore, Avendano *et al.* teaches wherein modifying the corresponding portions of said channel signals based on the extent to which said corresponding portions of said channel signals are correlated across channels comprises a nonlinear modification (see page 1959, left column, 2nd paragraph, line 10) (e.g. It is seen that a nonlinear modification is done. Further, the modification is done based on coherence, which is correlation (see page 1959, left column, 2nd paragraph, lines 11-16).

As to claim 33, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 31, above.

Furthermore, Avendano *et al.* teaches wherein modifying the corresponding portions of said channel signals based on the extent to which said corresponding portions of said channel signals are correlated across channels comprises calculating a cross channel coherence value (see page 1959, left column, equation 4).

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avendano *et al.* in view of Fincham as applied to claim 2 above, in view of Dolby *et al.* (4,024,344).

As to claim 8, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 2, above.

Furthermore, Avendano *et al.* teaches wherein corresponding portions re identified as not correlated or weakly correlated (see page 1959, left column, 2nd paragraph, lines 1-4) (e.g. the Avendano *et al.* reference states the value of the coherence function being close to zero for weakly correlated since ambience is present (see page 1958, right column, 1st paragraph, lines 3-4).

However, Avendano *et al.* in view of Fincham do not specifically teach the use of a threshold for identifying the not correlated portions.

Dolby *et al.* teaches the use of a threshold for correlated information (see col. 5, lines 4-10).

It would have been obvious to one of ordinary skilled in the art to have modified the modification of an audio signal as taught by Avendano *et al.* in view of Fincham with the use of a prescribed threshold as taught by Dolby *et al.* The motivation to have included such a feature involves the ability to recognize uncorrelated portions from correlated portions in order to detect whether the channels are operating in stereo or mono mode (see Dolby *et al.* col. 1, lines 56-59 and col. 2, lines 15-18), which benefits the system presented by Avendano *et al.* for the purposes of detecting stereo information and mono information when performing ambience extraction.

10. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avendano *et al.* in view of Fincham as applied to claim 9 above, in view of Katz (US 7,076,071).

As to claim 16, Furthermore, Avendano *et al.* in view of Fincham teach all of the limitations as in claim 9, above.

Furthermore, Avendano *et al.* teaches the utilization of a modification function to modify portions that is determined to be uncorrelated (see equation 5 and 6).

However, Avendano *et al.* does not specifically teach the use of user input for the modification input.

Katz *et al.* teaches the use of user input (see col. 14, lines 51-52).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have combined the modification of audio channels as taught by Avendano *et al.* in view of Fincham with the use of user input as taught by Katz. The motivation to have combined the two references involve the allowance of the user to set the modification function based on user preference and sound quality (see Katz, col. 9, lines 10-12) as would benefit the teachings presented by Avendano *et al.* audio signal based on user preference.

As to claim 17, Avendano *et al.* in view of Fincham in view of Katz teach all of the limitations as in claim 16, above.

Furthermore, Avendano *et al.* teaches the scaling factor by which the modification function is multiplied (see equation 6, parameters μ_1 and μ_o divided by 2). Katz teaches the use of user input.

As to claim 18, Avendano *et al.* in view of Fincham in view of Katz teach all of the limitations as in claim 16, above.

Furthermore, Avendano *et al.* teaches the value of a parameter comprising part of the modification function (see equation 6, parameters μ_1 and μ_o). Katz teaches the use of user input.

As to claim 19, Avendano *et al.* in view of Fincham in view of Katz teach all of the limitations as in claim 18, above.

Furthermore, Avendano *et al.* teaches wherein the parameter determines at least in part a maximum value for the modification function (see page 1959, sect. 4. left column, 2nd paragraph, lines 18-25).

As to claim 20, Avendano *et al.* in view of Fincham in view of Katz teach all of the limitations as in claim 18, above.

Furthermore, Avendano *et al.* teaches wherein the parameter determines at least in part a minimum value for the modification function (see page 1959, sect. 4. left column, 2nd paragraph, lines 18-25).

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avendano *et al.* in view of Fincham in view of Katz as applied to claim 16 above, and further in view of Klayman (US 6,285,7670).

As to claim 21, Avendano *et al.* in view of Fincham in view of Katz teach all of the limitations as in claim 16, above.

However, Avendano *et al.* in view of Fincham in view of Katz do not specifically teach the bandwidth for which the modification is performed. H

Klayman does teach the use of a bandwidth (see col. 20, lines 16-17).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the modification of the audio channels as taught by Avendano *et al.* in view of Fincham in view of Katz with the use of a bandwidth as taught by Klayman. The motivation to have combined the references allow for signal enhancement that is specific to the user (see Klayman, col. 20, lines 16-17), which would benefit the teachings of Avendano *et al.* for a specific frequency range of enhancement rather than the entire frequency spectrum.

12. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avendano *et al.* in view of Fincham as applied to claim 22 above, in view of Klayman (US 6,285,7670).

As to claim 23, Avendano *et al.* in view of Fincham teach al of the limitations as in claim 1, above.

However, Avendano *et al.* in view of Fincham does not specifically teach the bandwidth for which the modification is performed.

Klayman does teach the use of a bandwidth (see col. 20, lines 1-2).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the teachings of Avendano *et al.* and Katz with the use of a bandwidth presented by Klayman. The motivation to have combined the references allow for signal enhancement that is specific to the user (see Klayman, col. 20, lines 1-2), which would benefit the teachings of Avendano *et al.* for a specific frequency range of enhancement rather than the entire frequency spectrum.

Allowable Subject Matter

13. Claims 24-26 and 34-46 are allowed.

14. The following is a statement of reasons for the indication of allowable subject matter: Claims 24-26 and 34-46 contain allowable subject matter because none of the prior art or combination teaches the claimed limitation of an "input ratio ... numerator comprises ... uncorrelated...denominator comprises... overall signal channel; ... user input of output ratio." Further, none of the prior art or combination teaches the limitations "...the magnitude of the respective portions... that are not correlated... taking absolute difference of the magnitude values..." as required in claims 24 and 34.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Petroff (US 5,872,851) is cited to disclose the enhancement of two speaker channels. Chen *et al.* (US 6,999,590) is cited to disclose a three dimensional surround effect filters and the difference signals. Sugimoto (US 2002/0136412) is cited to disclose a surround reproducing circuit.

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paras Shah whose telephone number is (571)270-1650. The examiner can normally be reached on MON.-THURS. 7:30a.m.-4:00p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571)272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

P.S.
11/30/2007

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